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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Wenge Yang

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EXAMINER

ESTRADA, MICHELLE

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/805,273	Applicant(s) YANG, WENGE	
	Examiner Michelle Estrada	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-35, 37, 38 and 40-43 is/are pending in the application.
- 4a) Of the above claim(s) 27-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 35, 37, 38 and 40-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 35 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunikiyo (6,639,288) in view of Mui et al. (6,037,265), and further in view of Applicant's Admitted Prior Art (AAPA).

With respect to claim 35, Kunikiyo discloses depositing a conductive layer (6a/6b) upon a substrate (1a); depositing a conductive adhesive layer (5) comprising polysilicon between said substrate and said conductive layer, wherein said conductive adhesive layer has a minimum thickness required to provide adhesion between said substrate and said conductive layer for a robust structure that can withstand subsequent processing, wherein said conductive adhesive layer has a thickness of between 50 Å and 300 Å, wherein this range overlaps with the recited range of greater than 10 Å and less than or equal to 100 Å as recited in claim 35.

Kunikiyo does not disclose etching a portion of said conductive layer and a portion of said conductive adhesive layer utilizing a plasma (Fig. 5) without sacrificing said substrate, wherein said plasma comprises an etchant, wherein said etchant comprises chlorine, wherein said plasma is ionized and sustained by a first RF source

(78), and wherein said plasma is accelerated by a second RF source (84) (Col. 8, lines 4-15 and Col. 10, lines 28-33).

Mui et al. disclose depositing a conductive layer (22) upon a substrate (14); depositing a conductive adhesive layer (16) between said substrate and said conductive layer, wherein said conductive adhesive layer has a minimum thickness required to provide adhesion between said substrate and said conductive layer for a robust structure that can withstand subsequent processing, furthermore, Mui et al. disclose that the thickness of the conductive adhesive layer would depend upon the end use of the semiconductor, which is to contain layer (16) (Col. 6, lines 6-10); and etching a portion of said conductive layer and a portion of said conductive adhesive layer utilizing a plasma (Fig. 5) without sacrificing said substrate, wherein said plasma comprises an etchant, wherein said etchant comprises chlorine, wherein said plasma is ionized and sustained by a first RF source (78), and wherein said plasma is accelerated by a second RF source (84) (Col. 8, lines 4-15 and Col. 10, lines 28-33); wherein said etching is conducted at a pressure of between 2 mTorr and 4 mTorr (first table in Col. 12), wherein inherently this process would yield a semiconductor structure comprising a lower electrical resistance and a shorter vertical profile.

The combination of Kunikiyo and Mui et al. do not disclose that the substrate comprises a silicon oxide-silicon nitride-silicon oxide (ONO) layer.

AAPA disclose depositing a tungsten or tungsten silicide layer (101) over a layer of polysilicon (102), which was previously deposited on the substrate (103); wherein the

substrate could be an oxide, for example silicon oxide-silicon nitride-silicon oxide (ONO).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Kunikiyo, Mui et al. and AAPA to enable the ONO substrate material of AAPA to be used in the process of Kunikiyo and Mui et al. because one of ordinary skill in the art would have been motivated to look to alternative suitable materials to be used in the disclosed oxide substrate material of the combination of Kunikiyo and Mui et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine. See MPEP 2144.07. Furthermore, silicon oxide-silicon nitride-silicon oxide layer (ONO) forms a good bond with the polysilicon adhesive layer.

With respect to claim 38, Mui et al. disclose wherein the adhesive layer comprises polysilicon (Col. 5, line 30); and said conductive layer comprises tungsten silicide (Col. 5, line 32).

Claims 37 and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunikiyo in view of Mui et al. and further in view of AAPA as applied to claims 35, 38, 44 and 50 above, and further in view of the following comments.

Mui et al. do not specifically disclose wherein said conductive layer and said conductive adhesive layer have a combined thickness of approximately 3000 angstroms or less.

With respect to claim 37, Mui et al. disclose wherein said conductive layer and said adhesive layer could have a combined thickness of approximately 3000 angstroms

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or less, this would depend on the thickness chosen for the polysilicon layer and the conductive layer.

With respect to claim 40, Mui et al. disclose wherein a flow rate of said chlorine is approximately 40 to 140 sccm, which overlaps the recited range of claim 40 (40-100 sccm).

With respect to claim 41, Mui et al. disclose wherein a flow rate of said oxygen is approximately 4 to 70 sccm, which overlaps the recited range of claim 41 (4-12 sccm).

With respect to claim 42, Mui et al. disclose wherein said first RF source is approximately 200 to 1200 watts, which overlaps the recited range of claim 42 (800-1500 watts).

With respect to claim 43, Mui et al. disclose wherein said second RF source is approximately 30 to 300 watts (preferred) and 30-100(optimum), which overlaps the recited range of claim 43 (50-150 watts).

Response to Arguments

Applicant's arguments filed 12/16/05 have been fully considered but they are not persuasive.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does

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not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant argues that Mui et al. very clearly discourages the addition of oxygen to the etchant chemistry. However, oxygen is included as part of the etchants in Col. 9, lines 8-15, as Another Preferred Embodiment. This is another example besides the ones pointed out by Applicant in Col. 1, Col. 17 and Col. 18.

Applicant argues that there is no motivation in Mui to reduce the pressure during the etch process to 2-4 mTorr while using oxygen with chlorine. However, Mui discloses general conditions for etching the polysilicon in the first table of Col. 12, and this included the pressure of 0.5-50 mTorr.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is 571-272-1858. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2800.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michelle Estrada
Primary Examiner
Art Unit 2823

ME
February 28, 2006